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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,553	06/29/2001	Sa Kyun Rha	041501-5427	5092

9629 7590 02/28/2003

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EXAMINER

LEURIG, SHARLENE L

ART UNIT PAPER NUMBER

2879

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,553

Applicant(s)

RHA, SA KYUN

Examiner

Sharlene Leurig

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-16 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-16 in Paper No. 4 is acknowledged.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The type of phosphor gas included in the space between the substrates is not specified, and it is not clear whether the phosphor gas is itself a phosphor or an inert gas such as xenon or argon commonly known in the art for improving luminescence of fluorescent lamps. For the purposes of examination the phosphor gas will be interpreted as an inert gas.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 8-9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin (5,216,324) in view of Shibata et al. (6,153,973). Curtin discloses a flat type fluorescent lamp comprising a first substrate (Figure 1, element 14) and a second substrate (12), a first electrode (26) formed on the first substrate, the first electrode including a plurality of protrusions (Figure 3, triangular elements), a phosphor layer formed on the second substrate (Figure 1, element 24), and supports selectively formed between the first substrate and the second substrate (20).

Curtin lacks a second electrode formed on the phosphor layer but instead discloses a phosphor layer formed on a second electrode.

Shibata teaches the arrangement of a second electrode (Figure 15, element 150) on a phosphor layer (149).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's flat fluorescent lamp with a second electrode formed on the phosphor layer, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

Regarding claims 8 and 9, Curtin discloses a barrier layer formed on the first electrode (the first metal layer of the first electrode) (Figure 3, element 32). The barrier layer is made of silicon dioxide (column 4, line 41).

Regarding claim 16, Curtin discloses a first substrate made of a dielectric material, which is an insulating material (column 4, line 7).

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6. Claims 2-4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin (5,216,324) in view of Shibata et al. (6,153,973) as applied to claim 1 above, and further in view of Nakatani et al. (6,008,576). Curtin discloses a first electrode including a first metal layer formed on the first substrate (Figure 3, element 28) and the plurality of cone-like protrusions selectively formed on the first metal layer (Figure 3, triangular elements), but lacks explicit disclosure of the material of which the protrusions are made and explicit disclosure of the cone shape of the protrusions.

However, it is well known in the art to form electron emitters out of metal.

Regarding claim 2, Nakatani teaches protrusions formed of metal (column 5, line 59).

Regarding claim 3, Nakatani teaches protrusions formed of platinum (column 5, line 61).

Regarding claim 4, Nakatani teaches protrusions having a cone shape (column 5, line 59).

Therefore regarding claims 2-4 it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's cone-like protrusions out of a metal such as platinum to provide a flat fluorescent lamp with efficient emitter tips.

Regarding claim 15, Curtin discloses transparent first and second substrates (column 3, lines 4-7) and a first substrate made of glass (column 4, lines 41-42). Curtin lacks explicit disclosure of the material used to form the second substrate.

However, it is well known in the art to use glass for both substrates of displays.

Nakatani teaches the use of glass for both substrates (column 6, lines 36-45).

Therefore regarding claim 15 it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's lamp with substrates both made of glass to provide two transparent and inexpensive substrates.

7. Claims 5, 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin (5,216,324) in view of Shibata et al. (6,153,973) as applied to claim 1 above, and further in view of Yanagisawa et al. (6,259,198). Curtin discloses a flat fluorescent lamp with all the limitations discussed above, including spacer supports formed between the first and second substrates.

Curtin lacks supports having a greater contact area adjacent to the second substrate than the first, but discloses the need for reinforcement of the display (column 3, line 50).

Yanagisawa teaches the formation of support structures with a greater contact area adjacent to the second substrate than the first substrate to form a stable structure (Figure 16, column 7, lines 39-41). Since the front ribs (Figure 2, element FR) have a wider support surface facing the second substrate and the rear ribs (RR) have a wider support surface facing the front ribs than the first substrate, the support structures in general have greater contact with the second substrate than the first.

Therefore regarding claim 5, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's support elements with greater surface area contact on the second substrate to provide a more stable structure.

Regarding claim 6, Curtin lacks a second electrode formed on the second substrate as a matrix.

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It is well known in the art to form electrodes in matrix form to correspond to pixels of a display and it is also well known to improve the pixel quality.

Yanagisawa teaches the formation of a black matrix over the second electrode (column 12, line 41) to improve pixel differentiation and display quality. This combination results in a matrix appearance of the second electrode (Figure 14, element 19) where the matrix is the x-y formation of squares of the exposed second electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's second electrode to be formed in a matrix array to improve pixel quality.

Regarding claim 11, the metal protrusions formed on the metal layer in Curtin's flat fluorescent lamp, when combined with the matrix structure of Yanagisawa's second electrode, would correspond to areas of the second electrode that are directly over the first metal layer. The exposed portions of the second electrode that form Yanagisawa's second electrode matrix are directly over the first electrode (Figure 3, elements 2 and 15). The second electrode and the cathode emitter of Curtin's lamp also align with each other (Figure 1, elements 22 and 26). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's to have a matrix structure for the second electrode where the exposed sections of the second electrode correspond to the area of the metal layer with the protrusions.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin (5,216,324) in view of Shibata et al. (6,153,973) as applied to claim 1 above, and further

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in view of Vollkommer et al. (6,222,317). Curtin lacks disclosure of a phosphor gas in the space between the first and second substrates.

However, it is well known to provide a phosphor gas or inert gas between the substrates to improve the luminescence of the lamp.

Vollkommer teaches a xenon gas filling between the substrates (column 3, line 12) for a flat fluorescent lamp (column 3, line 51).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's flat fluorescent lamp with a phosphor gas such as xenon in between the substrates to improve the luminescence of the lamp.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin (5,216,324) in view of Shibata et al. (6,153,973) as applied to claim 1 above, and further in view of Nakamoto et al. (6,281,621). Curtin discloses a flat fluorescent lamp with all the limitations discussed above but lacks a first electrode formed of a metal layer and metal protrusions formed integrally.

However, it is well known in the art to develop less-complicated and more efficient emitter structures.

Nakamoto teaches the integral formation of a metal emitter tip and a first metal layer (column 10, lines 26-27) in order to obtain a simpler structure with good quality (column 10, lines 42-49).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Curtin's metal protrusions so as to be formed integrally with

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the metal layer in order to provide a simple emitting structure with good picture quality, as taught by Nakamoto.

Allowable Subject Matter

10. Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The claimed material is found to be allowable because no prior art has been found to show or suggest a flat fluorescent lamp where the spaces in the matrix of the second metal layer become greater toward the center of the second substrate in combination with the other limitations of the claimed invention, namely a first electrode having a plurality of protrusions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Sharlene Leurig
February 21, 2003

SL



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